Course Code	Course Name	Teaching Scheme (hrs/week)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	Practical/Oral	Tutorial	Total
BEITC703	Intelligent System	04	02	---	04	01	---	05

Course Code	Course Name	Examination Scheme							
		Theory Marks				Term Work	Practical	Oral	Total
		Internal assessment			End Sem. Exam				
		Test 1	Test 2	Avg. of 2 Tests					
BEITC703	Intelligent System	20	20	20	80	25	---	25	150

Course Objectives:

1. To introduce the students' with different issues involved in trying to define and simulate intelligence.
2. To familiarize the students' with specific, well known Artificial Intelligence methods, algorithms and knowledge representation schemes.
3. To introduce students' different techniques which will help them build simple intelligent systems based on AI/IA concepts.

Course Outcomes:

1. Students will develop a basic understanding of the building blocks of AI as presented in terms of intelligent agents.
2. Students will be able to choose an appropriate problem-solving method and knowledge-representation scheme.
3. Students will develop an ability to analyze and formalize the problem (as a state space, graph, etc.) and select the appropriate search method.
4. Students will be able to develop/demonstrate/ build simple intelligent systems or classical toy problems using different AI techniques.

DETAILED SYLLABUS

Module	Detailed Content	Hours
1	**Introduction:** Introduction to AI, AI Problems and AI techniques, Solving problems by searching, Problem Formulation.	04
2	**Intelligent Agents:** Structure of Intelligent agents, Types of Agents, Agent Environments PEAS representation for an Agent.	03
3	**Uninformed Search Techniques:** DFS, BFS, Uniform cost search, Depth Limited Search, Iterative Deepening, Bidirectional search, Comparing Different Techniques.	04
4	**Informed Search Methods**: Heuristic functions, Hill Climbing, Simulated Annealing, Best First Search, A*, IDA*, SMA*, Crypto-Arithmetic Problem, Backtracking for CSP, Performance Evaluation.	08
6	**Adversarial Search:** Game Playing, Min-Max Search, Alpha Beta Pruning.	03
7	**Knowledge and Reasoning:** A Knowledge Based Agent, WUMPUS WORLD Environment, Propositional Logic, First Order Predicate Logic, Forward and Backward Chaining, Resolution. , Introduction to PROLOG.	08
8	**Planning**: Introduction to Planning, Planning with State Space Search, Partial Ordered planning, Hierarchical Planning, Conditional Planning, Planning with Operators.	04
9	**Uncertain Knowledge and Reasoning:** Uncertainly, Representing Knowledge in an Uncertain Domain, Conditional Probability, Joint Probability, Bays theorem, Belief Networks, Simple Inference in Belief Networks.	06
10	**Learning:** Learning from Observation, General Model of Learning Agents, Inductive Learning, Learning Decision Trees, Rote Learning, Learning by Advice, Learning in Problem Solving, Explanation based Learning	05
11	**Expert Systems:** Representing and using Domain Knowledge, Expert System-shell, Explanation, Knowledge Acquisition	03

Text Books:

1. Stuart Russell and Peter Norvig, Artificial Intelligence: A Modern Approach, 2nd Edition, Pearson Education.
2. Elaine Rich, Kevin Knight, Shivshankar B Nair, Artificial Intelligence, McGraw Hill, 3rd Edition.
3. Elaine Rich, Kevin Knight, Artificial Intelligence, Tata McGraw Hill, 2nd Edition.

Reference Books:

1. George Lugar, .AI-Structures and Strategies for Complex Problem Solving., 4/e, 2002, Pearson Education.
2. Nils J. Nilsson, Principles of Artificial Intelligence, Narosa Publication.
3. Patrick H. Winston, Artificial Intelligence, 3rd edition, Pearson Education.
4. Deepak Khemani, A First Course in Artificial Intelligence, McGraw Hill Publication

Term work:

Term Work shall consist of at least 8 practical and 2 assignments based on the list given below:

Suggested Practical:

1. Implementing Water jug problem using 1. BFS. , 2. DFS (Un-Informed Search)
2. Implementing 8 puzzle problem with Heuristic function using Hill Climbing. (Informed Search)
3. Implementing 8 puzzle problem with Heuristic function – Best First Search (Informed Search)
4. Implementing 8 Queen Problem with Heuristic function (Informed Search)
5. Implementing Tic-Tac-Toe problem to demonstrate Min – Max and Alpha Beta Pruning. (Adversarial Search)
6. Implementing WUMPUS world problem. (Knowledge and Reasoning)
7. Introduction to PROLOG – solving Basic problems like Factorial, Fibonacci series, Implementing User Defined String functions etc. (PROLOG)
8. Implementing Family Information System (PROLOG)
9. Implementing Mini Expert system. (PROLOG)

(Note: List of experiments is not limited with the above list , teacher can choose different set of experiments but care should be taken to explore variety of topics.)

Term Work: 25 Marks (total marks) = 15 Marks (Experiment) + 5 Marks (Assignment) + 5Marks (Attendance (theory + practical))

Oral examination is to be conducted based on the complete syllabus.

Theory Examination:

1. Question paper will comprise of 6 questions, each carrying 20 marks.
2. Total 4 questions need to be solved.
3. Q.1 will be compulsory, based on entire syllabus wherein sub questions of 2 to 3 marks will be asked.
4. Remaining question will be randomly selected from all the modules.

Weightage of marks should be proportional to number of hours assigned to each module.